

Note:- Attempt all questions from Sec. A & B & only Two questions from Section C.

Section: A (Very short answer type questions)

Q1: i) Define set, subset & power set.

ii) Let $A = \{1, 2, 3, 4\}$, $B = \{2, 4, 7, 8\}$, find $(A \cup B) \cap (A \cap B)$

iii) Find $\lim_{n \rightarrow 1} \frac{n^2 - 1}{n - 1}$

iv) Evaluate $\lim_{n \rightarrow 0} \frac{\sqrt{1+n} - 1}{n}$

v) Find the derivative of $(a^n + b)^n$.

vi) Find the value of $\int (e^n + a^n) dn$.

vii) For $a \in B$, prove that $(a')' = a$.

viii) Define Boolean Algebra.

Section: B (Short answer type questions)

Q2: For any three set A, B, C , prove that $(A \cup B) \cap C = (A \cap C) \cup (B \cap C)$

Q3: Evaluate i) $\lim_{n \rightarrow 0} \frac{e^n - 1}{n}$ ii) $\lim_{n \rightarrow \infty} \log \frac{(1+n)^n}{n}$

Q4: From first principle, find the derivative of n^n , $n \in \mathbb{N}$.

Q5: Simplify the switching ckt

$$P * Q' + Q$$

Section: C (Long answer type questions)

Q6: a) Define Cartesian product of two sets.

If $A = \{3, 5, 7\}$ & $B = \{2, 4, 6, 8\}$, find $A \times B$ & $B \times A$.

b) Draw the graph of the function $y = n^2$.

Q7: a) What do you mean by limit of a function. Also,